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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,503	09/03/2004	Ryou Obara	1823-0123PUS1	8273

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EXAMINER
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SAVAGE, JASON L

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/501,503

**Applicant(s)**

OBARA, RYOU

**Examiner**

Jason L. Savage

**Art Unit**

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1-3-06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 14 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 20060103.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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Newly submitted claims 14-15 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Inventions of claims 1-13 and 14-15 are directed to related inventions. The related inventions are distinct if the inventions as claimed do not overlap in scope, i.e., are mutually exclusive; the inventions as claimed are not obvious variants; and the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect. See MPEP § 806.05(j). In the instant case, the inventions are not obvious variants since it would not necessarily have been obvious to have formed the thermally sprayed coating on a piston ring which has a lower coating of a hard chromium plating film or hard thermal spray coated film for the purposes of wear resistance.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 14-15 have been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation in claim 7 that the upper coating layer is formed on a lower coating layer which has a surface roughness as thermal spray coated and is not mechanically machined is indefinite since it is unclear whether it is the upper or lower coating layer is being defined as having the claimed surface roughness. Furthermore, the limitation 'surface roughness as thermal spray coated' is indefinite since it is unclear what this limitation entails. For purposes of Examination the claim has been treated as meaning the lower layer has a surface roughness.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCune, Jr. et al (US 5,364,663) in view of Mori (US 4,579,712).

McCune teaches thermally spraying coatings containing solid lubricant particles such as graphite in a metal matrix such as copper wherein the coatings are suitable for use in automotive components (col. 2, ln. 40-68). McCune further teaches that the metal matrix may be a copper-tin alloy such as bronze (col. 3, ln. 1-7). McCune also

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teaches that the coating may be applied to a chamber which contains a thrust element for an automotive engine component (col. 6, ln. 17-38). McCune also teaches that forming such a coating by thermal spraying allows for the formation of coatings having greater thicknesses and having greater adherence to the substrate (col. 3, ln. 33-51). Although McCune does not explicitly recite that the thermally sprayed coating is formed on a piston ring, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the sprayed coating of McCune on any automotive engine component that would benefit from having such as coating including piston rings.

McCune is silent to the composition of the copper-tin alloy containing graphite lubricant particles. Mori teaches a graphite containing phosphor bronze coating used as a material for piston rings (col. 1, ln. 7-16). Mori further teaches that the coating may comprise Sn between 7.5-16 wt%, graphite between 1-8 wt% and phosphorous between 0.03 to 1 wt% with the balance essentially consisting of Cu (col. 2, ln. 20-39). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used any alloy composition known to be suitable for use in automotive engine components including the copper composition taught by Mori with a reasonable expectation of success. One would have been motivated to modified the invention of McCune by using the composition of Mori since McCune does not provide any further guidance on the composition of the sprayed materials.

Regarding the limitation that graphite be from 5 to 50 % in the claims, the teaching in Mori of 1-8 wt% overlaps the claimed range between 5-8 wt%.

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Regarding claim 2, the coating formed by McCune as modified by Mori would meet the claim limitation of being formed on a peripheral surface.

Regarding claim 3, although McCune and Mori are silent to the volume ratio of the graphite particles. However, it is the position of the Examiner that the graphite would overlap the claimed volume ratio since Mori teaches the same amount of graphite which is claimed. In the alternative, absent a teaching of the criticality of the claimed volume ratio, it would not provide a patentable distinction over the prior art since Mori the same wt% of graphite.

Regarding claims 4 and 5, Mori teaches that phosphorus may be included in the coating in an amount of between 0.03-1 wt% which would meet the limitation that P be containing in an amount of 1.0 % at the highest in claim 4 and that the total amount of the claimed elements is no more than 25 % in claim 5

Regarding claim 6, Mori teaches the hardness of the coating layer is 55.0 Hv (col. 6, Table I). Although the hardness would vary somewhat from that disclosed in the table due to the greater amount of graphite and forming by thermal spraying as opposed to the powder deposition process recited by Mori, it would be reasonable to expect that the hardness would be substantially less than the 300 Hv maximum claimed by Applicant.

Regarding claim 7, McCune is silent to forming a coating structure having upper and lower coating layers. However, absent a teaching of the criticality of forming upper and lower layers, it would not provide a patentable distinction over the prior art. It would

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have been obvious to one of ordinary skill to have formed multiple layer coatings on the component of McCune in order to have formed a thicker coating.

Regarding claim 8, McCune teaches the coating thickness may be between 100-2000 $\mu$ m which overlaps the range claimed between 100-500  $\mu$ m (col. 3, ln. 44-51).

Regarding claims 9 and 10, the teaching of Mori that coating may comprise Sn between 7.5-16 wt% and graphite between 1-8 wt% (col. 2, ln. 20-39) overlaps the ranges of materials claimed.

Regarding claim 11, Mori teaches that a phosphorus content which overlaps the range claimed by Applicant between .03-0.5 wt%.

Regarding claim 12, although McCune and More are silent to the coating containing the claimed amount of Pb, Pb is a known additive for bronze alloys. It would have been within the purview of one of ordinary skill in the art to have added known additive such as Pb to the coating layer of McCune as modified by Mori with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the use of the claimed amount of Pb, it would not provide a patentable distinction over the prior art.

Regarding claim 13, McCune teaches the coating thickness may be between 100-2000 $\mu$ m which overlaps the range claimed between 100-500  $\mu$ m (col. 3, ln. 44-51).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

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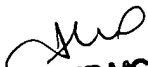
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason Savage  
3-8-06



JENNIFER MCNEIL  
PRIMARY EXAMINER  
3/12/06